

hours he spent in their midst, and we quite agree with him that such intelligent birds can't merit that nasty English word "stupid."

The accompanying illustration (Fig. 4) will give some slight notion of a nesting station of these interesting birds. At the time of the arrival of the expedition (October) the birds were preparing to hatch; each pair kept entirely to themselves; each nest had two eggs, large, nearly round, of a dirty white colour, but marked here and there with a few russet spots. Both birds partook of the cares attendant on the incubation, and took turn about on the nest. The bird off duty would at once make for the sea, faithfully returning at the appointed time, and never failing to waddle direct to its own nest, though no human being could see a difference between the thousands that were strewn about. Sometimes the whole camp of birds would have to be traversed ere the nest sought for would be gained, and a bird trying to make a short cut would be sure to be attacked by those whom it disturbed, for they are not at all tolerant of one another, and in this they also prove that they are not stupid, for surely neither stupid people nor stupid birds ever quarrel. On M. Vélain arriving in their midst, they would one and all set up an immense, and beyond measure stunning cry, but soon they would calm down, and seem not to mind his presence. The incubation lasted for five weeks. The little ones made their appearance covered all over with a fine close down, and looked like balls of fine grey-coloured wool. They soon got tired of the comforts of their nests, and began to assemble together with their little brothers and sisters of the same colony in large infant schools, which are presided over by some of the sedate old birds. Many times a day, at stated intervals, they are fed, the other portions they spend in sleeping and talking, and a little fighting. Space will not permit us to refer to many curious details about their swimming lessons.

M. Vélain's description of the molluscs of Saint Paul is an important contribution to science; the new species are well illustrated on four plates. As was to be expected, there are forty species of Gasteropods but nine of Acephala, and there is but a single Brachiopod; no land-shells seem to have been found. The cuttle-fish taken are not enumerated, but one gigantic ten-armed species was often alluded to by the fishermen, and at last, as if to prove their assertions true, one morning, after a great storm, a specimen thereof was thrown ashore, and fortunately was at once photographed; unfortunately only its head, arms, and pen could be preserved. The generic name of *Mouchezis* (after the commander of the expedition) has been proposed for it. Probably it comes near to Steenstrup's *Architeuthis*, which it resembles in size, by its having circular-shaped suckers, which were ornamented by a row of fine horny denticulations and by their arrangement on the arms, but from which it differs by the singularly shortened form of the short arms, which presented quite the appearance of having been abruptly truncated instead of running out to a more or less tapering point as in most cephalopods; and then the inferior termination of the dorsal ossicle is quite unlike that described by Steenstrup in his genus. *Mouchezia Sancti-Pauli* measured from the tip of its longest arms to the end of the body, upwards of twenty-two feet. A species of *Ommastrephes* swarmed in the adjacent sea and seemed to be the chief food of the penguins.

E. PERCEVAL WRIGHT

## NOTES

SYSTEMATIC botany has lost one of its greatest living names in the death of Elias Magnus Fries, Emeritus Professor of Botany in the University of Upsala. He was born August 15, 1794, and died on February 8 inst. His very numerous works, especially on fungi and lichens, give him a position as regards

those groups of plants only comparable to that of Linnæus. His services to science were recognised by the Royal Society in his election as a foreign member in 1875.

THE funeral service of M. Claude Bernard took place at Paris, at the public expense, on Saturday, February 16, at St. Sulpice, in presence of an immense assembly. The interment took place at Père-la-Chaise. The chief mourners were MM. Bardoux, the Minister of Public Instruction, Dumas and Bertrand, Perpetual Secretaries of the Academy of Sciences, Fizeau, President, Mezières, Chancellor of the Academy of Sciences, M. Paul Bert, who is filling the chair of Claude Bernard at the Jardin des Plantes, and Laboulaye. These gentlemen delivered addresses at the grave, which will be published in the *Comptes Rendus* and official papers.

FROM the last report of Dr. Dohrn, the director, we notice that the zoological station at Naples has developed a most remarkable degree of activity, and is becoming a valuable centre of biological research. By the generosity of the Prussian Government it has been provided with a small steamer, and the uninterrupted expeditions in this vessel have secured to the laboratories an enormous and most varied stock of material for research. Dr. Dohrn has carefully organised a plan for the systematic examination of the entire fauna of this part of the sea, to be accompanied by exhaustive description. The literary portion of the work will consist of elaborate monographs on all the families and species represented in the Gulf of Naples. They will not be prepared by the members of the station only, but it is hoped to procure the assistance of all familiar with this special department, and the contributions can be in English, French, German, or Italian. Two monographs on the Elenophoræ and Balanoglossi will appear during the present year, and arrangements have been made for the speedy preparation of eleven others. These will all be based, in regard to nomenclature and classification, on a work shortly to appear under the title, "*Prodromus Faunæ Mediterraneæ*," which will contain a complete abstract of the literature on this subject up to the present time. The details of anatomical and embryological investigation will form the leading feature of the whole work.

THE Radicals in the French Chamber cannot be accused of opposition to the claims of science. We notice that in a late session a member of the extreme left proposed an amendment to the budget of instruction, which provided for the appropriation of 30,000 francs for an expedition to California to observe the next transit of Mercury, 40,000 for the continuation of the explorations in Northern Africa, where it has been proposed to admit water from the Mediterranean, and 100,000 to enable the Abbé Debès to make a journey across Africa from Zanzibar to the Congo. As the appropriation was granted, we may hope soon to see the latter portion of it cause the appearance of a new rival of Stanley, for the Abbé has had, like Livingstone, invaluable experiences as a missionary, which will enable him to enter upon the undertaking with great promises of success.

THE Astronomical Section of the French Academy has been summoned by the Minister of Instruction to nominate two candidates for the vacant position of the late M. Leverrier.

IN Parisian scientific circles Prof. Charles Friedel is mentioned as the probable successor to the place in the Chemical Section of the Academy rendered vacant by the death of Victor Regnault.

A NEW Archaeological Institution at St. Petersburg was opened on January 27 last. The director and founder of the Institution, M. N. W. Katcholoff, delivered the inaugural address, in which he pointed out the importance of the archaeological investigation of the great Russian empire, and the great

support the Institution will offer to students of Russian archaeology. He also announced that the Russian Government had permitted the publication of a special organ of the Institution the first part of which would shortly appear, and would contain valuable details dating from the time of Alexander I.

A NEW Society of Ethnography, Archæology, and History is to be founded at the University of Kazan.

THE Annual Archæological Congress of France will take place this year at Mans and Laval, beginning at the former place on May 20 and closing at the latter on May 28.

AN interesting course of lectures has been inaugurated in connection with the new museum of ethnography at Paris, which is well adapted to heighten the value of these extensive collections. Nearly every afternoon is appropriated to a discourse by some well-known *savant* on topics illustrated in the museum. Among the subjects for the remainder of the month we notice "The Industrial Products of Central Asia," by M. de Ujfalvy; "The Ancient Mexicans," by Dr. Hamy; "The Lambaquis of Brazil," by M. Wiener; "Feathers, and their Employment among Savage Tribes," by M. Milne-Edwards; "Peruvian Ceramic," by M. Wiener; "Exploration of the Sahara," by Commander Roudaire; "The Useful Plants of Equatorial America," by M. André, &c. Like most of the lectures in Paris, these are free to the public.

THE works for establishing the monster captive balloon at the Tuileries have begun in the court of the old palace. The Municipal Council of Paris voted the demolition of the ruins at its last sitting. It is proposed by the Corporation that the demolition be completed for the opening of the Paris Exhibition.

NEWS from Berlin states that Signor Martinelli has started from Athens for Olympia in order to take the casts of the sculptures recently excavated, particularly of the Apollo of the western front of the building and of the Hermes of Praxiteles. The exhibition of the Olympian casts at Berlin will be deferred until Signor Martinelli has finished his work. All the other casts are now complete at the Campo Santo, near the Berlin Dome. The second volume of the "Ausgrabungen von Olympia," with thirty-five photographic plates, is in course of publication.

SIR JOHN LUBBOCK'S Ancient Monuments' Bill passed the second reading on Tuesday. We hope that it will this session pass successfully through the final stage.

MR. W. ACKROYD writes to us with reference to the mechanism of the ear and the bearing it may have on the structure and use of the telephone. In man the drum is inclined to the axis of the external ear passage at about an angle of  $46^\circ$ , and may be less or more in other animals. Mr. Ackroyd thinks that here we are taught that the best disposition of a membrane designed to receive aerial impulses is that of a less or greater angle to the resonating cavity in which it is placed, the value of this angle probably depending upon the depth and form, &c., of such cavity, points only to be ascertained by experiment. In communicating these ideas the other day to Mr. Wilson, of the Physical Laboratory, South Kensington, he stated that Mr. Newth, of the Chemical Laboratory, had found that his telephone worked best when he spoke into it in a slanting direction. Mr. Ackroyd thinks that telephonists will receive many valuable ideas from the study of the comparative morphology of the external auditory apparatus as Bell did by studying the action of the human tympanic membrane.

WE learn from the Annual Report of the Russian Hydrographical Department, just appeared, that during the year 1876 the officers of the department took soundings in the Baltic Sea and along the Finnish shores for 1,100 miles, in the Gulf of Bothnia for 2,130 miles, in Lake Onega for 870 miles, and in the Black Sea for 2,170 miles.

THE Central Physical Observatory at St. Petersburg has issued its report for 1876, containing meteorological observations made during that year at ninety-eight stations, according to the international regulations. An appendix gives the results of the hourly observations made at Moscow during the last fourteen years.

WE are glad to announce the opening at St. Petersburg of a new hygienic society. It is divided into five sections: Biology; Statistics and Epidemiology; Hygiene of towns, manufactures, and public buildings; Hygiene of schools; and Hygiene of food. Prof. Zdekauer is president of the Society, and among the members are some of the most prominent names in the St. Petersburg University and Academy of Sciences.

SINCE January 5 a new *Allgemeine Technikzeitung* has been appearing at Leipzig (Schäfer) every week. It is a well-written serial and contains frequent reports of the latest progress of the natural sciences from a practical point of view.

THE German Emperor has presented a most valuable collection of arms and weapons to the Ethnographical Department of the Royal Museum of Berlin. The collection was made by Herr Erdmann, the German Consul at Samarang (Java), and consists of weapons from Java, Sumatra, Borneo, Celebes, Flores, Amboina, and other islands of the great Archipelago.

EARTHQUAKES are reported from the Lower Danube on January 31 at 4.30 A.M. It is also announced that the cities of Lima and Guayaquil, in South America, have suffered terribly from recent shocks.

FOR the first time since 1840 Lisbon has been visited by snow. Besides 1840 the years 1837 and 1839 were characterised by this phenomenon.

IN studying the vibrations of solid bodies, M. Dubois has recently got some interesting effects by use of water mixed with vermilion. If this be put on the branches of a tuning-fork which is vibrated, striae are produced, the vermilion settling in the grooves of the liquid, and giving a figure. Operating first with tuning-forks, then with sounding-tubes and vibrating-plates, M. Dubois arrived at these two laws:—1. Two sounds produced by different instruments give the same separation of striae, if these sounds are of the same pitch. 2. Two sounds of different pitch give striae inversely proportional to the numbers of vibrations of the sounds. In the case of the pipes (which were open), a small band of paper carrying the liquid charged with vermilion was fixed with wax at the open part. The vibration of the air immediately produced striae. The blast being adapted to give a grave fundamental sound, a certain set of equidistant divisions was produced; then on blowing to sound the octave, these divisions remained, but a second set of intermediate lines appeared.

AT p. 113, vol. xvi. of NATURE we drew attention to the gratuitous distribution of a little pamphlet entitled "Notes for Observations of Injurious Insects." This was issued under the auspices of a few well-known entomologists with a view of obtaining any information, however varied, on the habits of the insects and the conditions of the crops most conducive to their increase. It will be remembered that the late Mr. Andrew Murray took a lively interest in the question of the destruction of the crops by insect pests, and read a paper on the subject before the Society of Arts, so that the returns which have been received in answer to the above-mentioned pamphlet and which are now embodied in the form of a report will be specially interesting to entomologists and valuable to cultivators. It is satisfactory to find that some well-known pests were not so abundant in some districts last year as they were in the preceding year; thus we are told that near Isleworth but little injury was noticed amongst the onions from the fly, *Anthomyia ceparum*, though in 1876 it was very destructive, which indeed was the case generally



in the western suburbs of London, and perhaps also in other parts. Two remedies are recommended for warding off the insects; one by scattering amongst the plants some pulverised gas-lime, and the other by watering with the liquid from pigsties. The clouded yellow butterfly (*Colias edusa*) was, it seems, "the great appearance of the year," and was first seen near Dumfries early in June, and across the south of England it was generally observable from June till October. The frequent death of the larvæ when feeding on various clovers and trefoils is mentioned as a point of interest relatively to its permanent settlement, as also the great difference in the quantity of the sexes noticed at various stations which may be followed by coincident variety of appearance next year. The report is published by Mr. T. P. Newman, Botolph Lane, Eastcheap, from whom we believe copies may be obtained. Every information on the subject will also be supplied on application to the Rev. T. A. Preston, The Green, Marlborough, Wilts, E. A. Fitch, Esq., Maldon, Essex, or Miss E. A. Ormerod, Dunster Lodge, Spring Grove, Isleworth.

THE St. Petersburg University has addressed a note to the Ministry of Public Instruction requesting that the necessary steps be taken for the preservation of any valuable manuscripts which may be found in the Turkish towns occupied by Russian troops. Valuable manuscripts were preserved in this way from destruction in the War of 1829, and important manuscripts have already been discovered in the mosques of Timova.

A SMALL Japanese "blue" book comes to us in the shape of a report by the department of Public Hygiene on some of the mineral waters of the country and the uses to which they may be put. Japan seems to contain a great variety of such waters.

AT the meeting of the Musical Association on February 4 a paper was read by Mr. D. J. Blaikley, "respecting a Point in the Theory of Brass Instruments." The necessary difference in form between such instruments and conical tubes was pointed out, and a new experimental method for determining the positions of the nodal points in tubes, especially applicable to such as are of varying section, was shown. As an instance may be given a conical tube open at both ends and of the pitch C 512 vib. The node is nearer the small than the large end of the tube, and by sinking one end in water and holding a fork of the pitch of the tube over the other, the exact position of the node is shown by the level of the water when the tube is giving its maximum resonance.

THE additions to the Zoological Society's Gardens during the past week include two Macaque Monkeys (*Macacus cynomolgus*) from India, presented by Lieut.-Col. Fielden; a Grivet Monkey (*Cercopithecus griseo-viridis*) from North-east Africa, presented by Mr. E. H. Lockley; a Garden's Night Heron (*Nycticorax gardeni*) from South America, presented by Mr. Henry Bottrell; three Chimpanzees (*Troglodytes niger*) from West Africa, deposited; a Black-faced Spider Monkey (*Ateles ater*) from East Peru, a Collared Peccary (*Dicotyles tajaçu*) from South America, a Globose Curassow (*Crax globicera*) from Central America, a Black-footed Penguin (*Spheniscus demersus*) from West Africa, a Hey's Partridge (*Caccabis heyi*) from Arabia, purchased.

### ON COMPASS ADJUSTMENT IN IRON SHIPS<sup>1</sup>

I.—*New Form of Marine Azimuth and Steering Compass with Adjuncts for the complete Application of the Astronomer-Royal's Principles of Correction for Iron Ships.*

THIRTY-EIGHT years ago the Astronomer-Royal showed how the errors of the compass, depending on the influence experienced from the iron of the ship, may be perfectly corrected

<sup>1</sup> Report of paper read to the Royal United Service Institution, February 4, by Sir Wm. Thomson, LL.D., F.R.S., P.R.S.E., Professor of Natural Philosophy in the University of Glasgow, and Fellow of St. Peter's College, Cambridge. Revised by the Author. [The Council of the U.S.I. have kindly permitted us to publish Sir W. Thomson's paper in advance, and have granted us the use of the illustrations.—ED.]

by magnets and soft iron placed in the neighbourhood of the binnacle. Partial applications of his method came into immediate use in merchant steamers, and within the last ten years have become universal not only in the merchant service, but in the navies of this and other countries. The compass and the binnacles before you are designed to thoroughly carry out in practical navigation the Astronomer-Royal's principles. The general drawback to the complete and accurate realisation of plans for carrying out these principles heretofore, has been the great size of the needles in the ordinary compass which renders one important part of the correction, the correction of the quadrantal error for all latitudes by masses of soft iron placed on the two sides of the binnacle, practically unattainable; and which limits, and sometimes partially vitiates, the other chief part of the correction, or that which is performed by means of magnets placed in the neighbourhood of the compass. Five years ago my attention was forced to this subject through my having been called upon by the Royal Society to write a biographical sketch of the late Archibald Smith, with an account of his scientific work on the mariner's compass and ships' magnetism, and I therefore commenced to make trial compasses with much smaller needles than any previously in use; but it was only after three years of very varied trials, in the laboratory and workshop, and at sea, that I succeeded in producing a mariner's compass with the qualities necessary for thoroughly satisfactory working in all weathers and all seas, and in every class of ship, and yet with small enough needles for the perfect application of the Astronomer-Royal's method of correction for iron ships. One result at which I arrived, partly by lengthened trials at sea in my own yacht, and partly by dynamical theory analogous to that of Froude with reference to the rolling of ships, was that steadiness of the compass at sea was to be obtained not by heaviness of needles or of compass-card, or of added weights, but by longness of vibrational period<sup>2</sup> of the compass, however this longness is obtained. Thus, if the addition of weight to the compass-card improves it in respect to steadiness at sea, it is not because of the additional friction on the bearing-point that this improvement is obtained; on the contrary, dulness of the bearing-point, or too much weight upon it, renders the compass less steady at sea, and, at the same time, less decided in showing changes of the ship's head, than it would be were the point perfectly fine and frictionless, supposing for the moment this to be possible. It is by increasing the vibrational period that the addition of weight gives steadiness to the compass; while, on the other hand, the increase of friction on the bearing-point is both injurious in respect to steadiness, and detrimental in blunting it or breaking it down, and boring into the cap, and so producing sluggishness, after a short time of use, at sea. If weight were to be added to produce steadiness, the place to add it would be at the very circumference of the card. My conclusion was that no weight is in any case to be added, beyond that which is necessary for supporting the card; and that, with small enough needles to admit of the complete application of the Astronomer-Royal's principles of correction, the length of period required for steadiness at sea is to be obtained, without sacrificing freedom from frictional error, by giving a large diameter to the compass-card, and by throwing to its outer edge as nearly as possible the whole mass of rigid material which it must have to support it.

In the compass before you (Fig. 1), these qualities are given by supporting the outer edge of a card on a thin rim of aluminium, and its inner parts on thirty-two silk threads or fine copper wires stretched from the rim to a small central boss of aluminium, thirty-two spokes, as it were, of the wheel. The card itself is of thin strong paper, and all the central parts of it are cut away, leaving only enough of it to show conveniently the points and degree-divisions of the compass. The central boss consists of a thin disc of aluminium, with a hole in its centre, which rests on the projecting lip of a small aluminium inverted cup mounted with a sapphire cap, which rests on a fixed iridium point (Figs. 2 and 3).

Eight small needles from  $3\frac{1}{4}$  inches to 2 inches long, made of thin steel wire, and weighing in all fifty-four grains, are fixed like the steps of a rope ladder on two parallel silk threads, and slung from the aluminium rim by four silk threads or fine copper wires through eyes in the four ends of the outer pair of needles.

The weight of the central boss, aluminium cup, and sapphire

<sup>2</sup> The vibrational period, or the period (as it may be called for brevity) of a compass, is the time it takes to perform a complete vibration, to and fro, when deflected horizontally through any angle not exceeding  $30^\circ$  or  $45^\circ$ , and left to itself to vibrate freely.